

What is claimed is:

1. A method and delivery system comprising a cartridge and an actuating device to deliver dental materials.
2. A method and delivery system according to claim 1 where the cartridge contains a viscous dental restorative material.
3. A method and delivery system according to claim 2 where a controlled heat within a specific range is delivered to the cartridge.
4. A method and delivery system according to claim 3 where the delivery of such controlled heat will take advantage of properties of the restorative material in the cartridge according to claim 2 and allow for a significant reduction in the viscosity of the dental mixture.
5. A method and delivery system according to claim 4 whereby a controlled heat at the point of delivery will significantly reduce the viscosity according to claim 4.
6. A method and delivery system according to claim 3 whereby a controlled heat from any source whether exogenous or endogenous applied to the cartridge according to claim 2 will significantly reduce the viscosity of the dental mixture in such cartridge.
7. A method and delivery system according to claim 3 whereby the application of heat in claim 6 will not alter the physical or chemical properties in the mixture prior to dispensing.
8. A method and delivery system according to claim 4 and claim 5 that will not alter the chemical, physical or optical properties subsequent to curing with the appropriate curing method for each specific mixture according to claim 2.
9. A method and delivery system according to claim 3 which will allow dental mixtures containing an A and B component to have their ratios changed such that they may be contained in a single cartridge pre-mixed without undergoing a chemical or physical change.
10. A method and delivery system according to claim 3 which will add the desired delta energy to mixtures in claim 9 to take advantage of the reduction of viscosity in claim 4, thus initiating the self curing reaction.
11. A method and delivery system according to claim 9 where such mixtures will be able to have a dual curing method, one chemically and the other using appropriate exogenous energy sources, usually a light source.
12. A method and delivery system according to claim 1 and 4 where the effect of the significant reduction in viscosity will allow for any size and shape configuration of the cartridge or open end of the cartridge enhances the flow, placement or proper fill by the dental mixture.

13. A cartridge, comprising:

a hollow elongated uniformly cylindrical body of determined length and uniform diameter interiorly and exteriorly and molded from a rigid plastic material, one end of said body being open and formed at the distal extremity to allow for a female recess(es). This/these recess/recesses engage(s) a male projection(s) such that when the cartridge is turned there is a positive, watertight engagement between the cartridge and the barrel of the actuating device.

a discharge nipple of the same material as the body and molded integrally therewith and having a passage there through extending from said closed end of said body to facilitate directing discharge from the cartridge to the interior of an oral cavity, said nipple having a wall, said wall having an outer surface with a proximal diameter proximal to said body and a medial diameter to said body, said medial diameter being substantially equal to said proximal diameter.

a piston having sidewalls closely complementary to the inner walls of said body and inserted into the open thereof to form a combination closure and ejecting means for material when contained in said cartridge, the inner end of said piston being hemispherical and complementary in shape to the interior surface of the closed end of said body to effect ejection of substantially the entire contents of said cartridge when said piston fully inserted into said body of the cartridge and

sealing means comprising a cup-shaped cap removable connected to the discharge nipple on said body to close said outer end of the nipple to seal the contents of the cartridge against ingress of ambient atmosphere and other contaminating matter.

14. The cartridge according to claim 13 further characterized by said body and piston being formed from plastic material suitably colored to render the same impervious to the transmission of ambient light, thereby rendering the cartridge adapted to contain light-curable material and the like in a manner to prevent premature curing of such material while stored in such cartridge

15. The cartridge of claim 13 wherein said cap is color-coded to indicate desired properties of the contents of the cartridge

16. A cartridge of claim 13 wherein said wall formed by the differing diameters of the inner surface and outer surface contains a wire of appropriate configuration with leads passing through the distal end of said cartridge forming a secure direct circuit with connecting leads in the barrel of the connecting actuating device.

17. A cartridge of claim 16 where the wire contained between the inner wall and the outer wall of the cartridge is fabricated of a material such that when a current is passed through such wire that a heat is generated by such electrical resistance of the embedded wire.

18. A cartridge of claim 13 and 16 has a thermocouple of appropriate means that is placed either within the cartridge wall embedded in the plastic or is located on the inner surface or outer surface of the cartridge.

19. A cartridge of claim 17 and 18 where a thermocouple of appropriate means will interact with the electrical current of claim 16 by such methods of control appropriate to the method and the system to allow for control of the temperature of such embedded wire as in claim 17.
20. A cartridge of claims 16 and 18 where the coil embedded in the wall of the cartridge is of such nature, that when an electrical current of the appropriate nature is passed through such coil from the connection to the actuating device, an induction field is created within the coil.
21. A cartridge of claim 20 where horizontal rods of an appropriate material running longitudinally with the length of the barrel but not in direct connection to the coil in claim 20 are located within the walls of the cartridge such that they become heated when the appropriate current is applied to the induction coil.
22. A cartridge of claim 20 where the longitudinally directed rods located in the wall of the cartridge can act as a thermocouple as in claim 19.
23. A cartridge where the rigid container is fabricated from any material, such as metal, doped thermally conductive polymers and the like, such that when a current is applied, directly or indirectly heat will be generated on the surface or within the walls of the cartridge.
24. A cartridge where the application of any spray, ink, decal and the like that when a current is applied heat will be generated within the walls or on the surface of the cartridge.
25. A cartridge where any material as directed in claims 16 through and including 24, where a current of any means is directed to create heat within or around the cartridge of claim 13.
26. A cartridge as in claim 25 where a current of any means directed to a cartridge in claim 13 is used to increase the temperature of the material within such cartridge, in such manner as to decrease the viscosity, so as to effect the use of such material as in claim 12.
27. A cartridge as in all previous claims, containing materials such that when an appropriate current is applied will undergo a viscosity change to effect their delivery, can be used in commerce and industry other than dentistry.
28. A cartridge as in claim 13, containing elements of any configuration, of any appropriate material such that when an appropriate energy field generated from an induction coil not contained within the cartridge itself, will cause such configured elements to heat.
29. A cartridge as in claim 23 where an induction field not contained within the cartridge itself will cause the cartridge to heat.
30. A cartridge fabricated from any material with a high specific heat to take advantage of rapid heating and slow cooling.
31. A cartridge in claim 30 combined with any polymers currently used in the fabrication of

dental cartridges, but not limited to such fields where a rapid heating and slow cooling of such cartridge is achieved. Such polymers as polypropylene, polyvinylchloride, polyethylene but not limited to such materials.

32. A cartridge as in claims 30,31 where heat is applied from any source.

33. A cartridge combined with a delivery device.

34. A cartridge as in claim 13 combining any and all combinations of the embodiments of claims 13-32 inclusive combined with a delivery device.

35. A delivery device coupled with a cartridge containing any or all of the embodiments as stated in claims 13-31 inclusive.

36. A delivery device for dispensing a paste material from a cartridge, said delivery device comprising:

a housing comprising a forward and rearward end; said housing accommodating a cartridge containing a paste material at said forward end;

a removable plunger slidably arranged in said rearward end of said housing and acting on the cartridge for dispensing the paste material when actuated;

a pivot handle pivotably connected to said housing for actuating said plunger;

at least one securing tongue connected to said housing;

at least one securing tongue releasably securing the cartridge at said housing end.

37. A delivery device as in claim 33, containing a barrel connected to a handle.

38. A delivery device as in claim 34, containing a barrel of a thermally non-conductive, high heat resistant polymer that is freely able to rotate at it's connection with the handle.

39. A delivery device as in claim 35, containing a barrel that has a flange at it's distal end.

40. A delivery device as in claim 36, where the barrel fits into a recess in said handle in an appropriate configuration and fit, such that the barrel may be rotated.

41. A delivery device as in claim 37, having a hollow cavity from it's distal end to it's proximal end to accommodate a plunger.

42. A delivery device as in claim 38, where said plunger has an extension of a smaller diameter extending from its proximal end.

43. A delivery device as in claim 39, where the plunger extension is of such a diameter as to engage the piston located in the cartridge as in claim 13.
44. A delivery device as in claim 40, where the plunger extension travels in a longitudinally direction for a certain distance to expel completely the substance contained in said cartridge as in claim 13.
45. A delivery device as in claim 34, where the barrel contains a(n) appropriate electrical connection(s) on it's proximal face.
46. A delivery device as in claim 42, where the electrical connection of the barrel, connects with an appropriately located electrical connection located in the distal face of the cartridge as in claim 13.
47. A delivery device where the barrel as in claim 34, has an extension of such length as to cover the cartridge from it's connection surface within the barrel to such length that the dispensing tip of the cartridge as in claim 13, is not impeded from performing in an adequate manner.
48. A delivery device as in claim 44, where the extension of the barrel contains an induction coil.
49. A delivery device as in claim 45, where the induction coil is placed within the barrel to provide the optimal induction field such that the material contained within the cartridge is heated to it's optimum temperature in the shortest time frame without degrading the material contained within the cartridge.
50. A delivery device as in claims 42-46, inclusively where connecting leads for the appropriate current are contained within the wall of the barrel and run distally to the handle of the dispensing device as in claim 33.
51. A delivery device as in claim 47, where connecting leads are affixed to a current on/off switch located within the handle.
52. A delivery device as in claim 48, where a temperature control device, is connected to the appropriate power source.
53. A delivery device as in claim 49, where the temperature control device is connected to a thermocouple of the appropriate nature in a feedback mechanism through the connecting leads, either to the cartridge or the material contained within the cartridge.
54. A delivery device as in claim 50, where the connection of the rotating barrel, containing the electrical leads contains and appropriate electrical contact such that when the barrel is rotated, the electrical current is not compromised.
55. A delivery device as in claim 51, where an energy producing device, such as a battery, AC/DC connection or capacitor discharge device is located.

56. A delivery device as in claim 52, where the handle, containing the barrel, has a pivot connection at a position such that a force exerted to a distal handle will cause the plunger to move forward in a longitudinal direction.

57. A delivery device as in claim 52 where the plunger's distal end has a round surface with engages an incline such that when force is applied to the distal handle, a smooth horizontal movement of the plunger is made as the incline in the distal handle and the rounded end of the plunger engage.

58. A delivery device as in claim 54, where the distal length of the plunger between the distal handle and the distal face of the forward handle contains a coiled spring around said length between the distal handle and the distal face of the proximal handle.

59. A delivery device where a linear stepper motor replaces the removable plunger as in claim 33 and is connected to the housing with a bayonet connection, and provides the appropriate electrical connection, such that actuating the on off switch will cause the material within the cartridge as in previous claims to be heated and delivered in prescribed increments with the necessity of manual pressure on the distal handle.

60. A delivery system as in claim 56 any and all combinations of the preferred embodiments of the cartridge and the delivery device, coupled with the linear stepper motor will not be compromised.

61. The present invention, is in no way restricted to the specific disclosure of the specification and drawings, but also encompasses any modifications within the scope of the appended claims.